

# NISTTech

## Method for the Chemical Precipitation of Metallic Silver Powder via a Two Solution Technique

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**A mercury-free silver dental amalgam for bright fillings**

### Description

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Replace conventional dental amalgams with a mercury-free metallic restorative. The restorative may be prepared in the dental office and placed in a cavity in the same amount of time as traditional amalgams. This method employs a two solution technique to produce a silver powder having the right particle size distribution to enable hand consolidation. This silver restorative equals or exceeds the transverse rupture strength, shear strength, creep, toughness, corrosion resistance, microleakage, and wear properties of conventional silver amalgam.

### Applications

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- **Dental**

These compounds could replace mercury filled dental fillings

### Advantages

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- **No mercury required**

### Abstract

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A method for the chemical precipitation of metallic silver powder employs a two solution technique in which a solution of a tin salt and a solution a silver salt are mixed in the presence of an inorganic or organic acid, alumina, an anionic surfactant, and a colloid to form a precipitation solution at a temperature and pH suitable to effect the chemical precipitation of silver. Almost 80% by weight of the precipitated powder agglomerate is less than 25  $\mu\text{m}$  in diameter, and the individual powder particles which compose the agglomerate range in size from 0.2 to 2.0  $\mu\text{m}$ . In addition to the favorable size distribution, silver particles precipitated in the presence of a gelatin colloid can be used with a minimal amount of sieving so that little work hardening is imparted to the particles. The powder can be annealed at a temperature of up to 750° C. for two hours in air with minimal sintering, and the acid-assisted hand consolidation of powder produced according to the present technique is capable of producing silver compacts which are nearly 80% dense. Advantageously, a hand consolidated silver compact which comprises the powder of the present invention equals or exceeds the transverse rupture strength, shear strength, creep, toughness, corrosion resistance, microleakage, and wear properties of conventional silver amalgam.

## Inventors

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## References

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- Expired U.S. Patent # 6,110,254
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## Status of Availability

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This technology is available in the public domain.

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